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Running head: ESTABLISHING AN ELECTRONIC PRESCRIBING POLICY FOR TEXAS

Recommendations for Establishing Policy for Electronic Prescribing in the State of Texas

Graduate Management Project

Capt Steve Fleming

U.S. Army-Baylor University Graduate Program

in Health and Business Administration

June 24, 2008

Preceptor: Bill Rasco, Col (ret), USAF

Reader: Maj Paul Brezinski, USAF, MSC

Abstract

This study examines the issue of medication errors and viable policy for the state of Texas to address such errors. Examination of various studies suggests over 500,000 preventable adverse drug events (ADEs) occur each year during outpatient care. The Institute of Medicine estimates each preventable ADE's occurring in outpatient settings costs $1,983 in year 2000 dollars. With the establishment of preventable ADEs as a substantial problem, further review of medication error studies indicates that health information technology provides a means of reducing errors by 50 percent or more. Analysis of the political circumstances reveals that federal lawmakers have focused attention on health information technology, in general, and electronic prescribing, in specific, but Texas lawmakers have widely ignored the issue. Industry interest groups are broadly in favor of electronic prescribing, but physicians hold concerns that electronic prescribing systems may produce a significant cost burden to their practices. The advent of a cost-free electronic prescribing solution effectively answers physician concerns regarding cost. This study demonstrates that medication errors represent a substantial problem, that electronic prescribing is a sound solution to this problem, and that a window of opportunity exists because of the availability of a cost-free electronic prescribing solution. The analysis of policy options supports electronic prescribing adoption led by Texas physicians, pharmacies, and health insurers.

Disclosure

All data regarding medication errors or adverse drug events was obtained from previously published reports. No individual patient data was used in this study. As such, the researcher did not find any significant ethical concerns with the use of the data published in this report. The author has no financial interest in the outcome of this policy analysis.

The views expressed in this study are those of the researcher and do not reflect the official positions of the Department of the Army, Air Force, Navy, or Defense; Baylor University; the Greater San Antonio Hospital Council; or the U.S. Government.

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To my reader, Maj (Dr.) Paul Brezinski: As I've written above, I have a foundation, love, support, and drive. However, these things cannot be put to use without direction. Your guidance on this project has been invaluable. Thank you.

To my preceptor, Col (ret.) Bill Rasco, this project began and evolved under your mentorship. Colonel, you have provided a year of unique learning experiences that are unmatched by any other residency venue. Thank you.

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Introduction

Medical capabilities of the United States are enviable by any standard. Leaders in technology and innovation, the U.S. sets many technological trends in the field of medicine. Research centers such as The Mayo Clinic, Johns Hopkins School of Medicine, and the University of Texas' M.D. Anderson Cancer Center are world renown for medical innovations that save lives. Despite all of the positive aspects of U.S. medicine, many problems still exist within the U.S. system. In terms of healthcare cost, the U.S. substantially outspends many fellow member nations of the Organization for Economic Cooperation and Development (OECD). In 2003, the U.S. spent 15% of gross domestic product (GDP) on health care, while the OECD median was 8.4% (Anderson, Frogner, Johns, & Reinhardt, 2006). In 2006, healthcare costs grew to over $2 trillion, 16% of the Gross Domestic Product (CMS, 2008).

If the resources consumed are any indication of quality, the U.S. healthcare system should be providing the highest quality of care. However, according to a 2007 comparative study of six industrialized nations (U.S., U.K., Canada, Australia, Germany, and New Zealand) based on cost and five dimensions of a high performance health system (quality, access, efficiency, equity, and healthy lives), the United States ranked last overall with the highest health expenditures per capita (Davis et al., 2007). Of note, the U.S. ranked lowest of the six compared nations with regard to safety of care. The safety portion of the study compared a survey of patients and primary care physicians from all six nations. The survey polled patients and physicians regarding errors and patient data availability. Safety concerns are not new to the U.S. health system. In 2000, the Institute of Medicine (IOM) illuminated the issue with the release of *To Err is Human*. The landmark study estimated that between 44,000 and 98,000 patients die in the United States each year due to medical errors (IOM, 2000). Many more errors occur that do

not result in death, but require further treatment and inflict unnecessary pain and suffering. Incredibly, it seems the citizens of the United States pay more per capita for more dangerous healthcare than many other nations' citizens pay for their healthcare system.

Estimating the costs of errors requires examination of expenditures and lost opportunities. In *To Err is Human,* the IOM estimated the total national cost (lost income, lost household production, disability, and health care costs) of preventable medical errors to be between $17 billion and $29 billion, with healthcare costs representing over half of that estimate (IOM, 2000). While half of the estimated total costs are absorbed by care or diagnostic services that would have otherwise been unnecessary, the remainder of the costs are in form of lost productivity. The result is compounded economic damage to patients. Not only is their productivity diminished, but remaining resources are then tapped to cover the costs of unnecessary care.

The majority of medical errors are medication errors (Thomsen & Schroeder, 2004). Therefore, to begin addressing medical errors in an incremental fashion, it is advisable to consider medication errors first. Elimination or mitigation of medication errors would substantially increase the safety and decrease the cost of the healthcare Texans receive. The purpose of this paper is to explain why medication prescribing is a segment of healthcare delivery ready for automation and how the appropriate policy can facilitate the successful adoption of technology that could save lives and reduce cost.

Evidence

Medical errors are a major issue. The study *To Err is Human* indicates the number of patients that die each year due to medical errors is between the 5th and 8th leading cause of death in the United States (IOM, 2000). Medical errors generate an estimated cost of $17 billion to $29 billion in addition to thousands of lives annually. Medical errors encompass many circumstances

across a wide field of disciplines. Errors occurring during nursing care, surgery, diagnosing, treating, or medicating are all medical errors. Policy focused on the prevention of medical errors is one way to address the existing problem. In order for policy to be successful, a problem must exist with a viable solution under favorable political circumstances (Longest, 2002). As such, it is not possible to address all medical errors at the same time, from the same perspective. This paper will describe the medication error problem, the viable electronic prescribing solution, and the political circumstances required for favorable implementing of the electronic prescribing solution.

Problem

Medication errors are the most prevalent type of medical errors (Thomsen & Schroeder, 2004). Medication errors are errors caused by commission or omission during the process of procuring, prescribing, dispensing, administering, and monitoring the patient's response to medication (IOM, 2007). Alternately, the National Coordinating Council for Medication Error Reporting and Prevention (n.d.) defines medication errors as, "...any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer..." The IOM estimated that medication errors accounted for over 7,000 deaths annually in the United States (2000). By comparison, only 6,000 deaths each year are attributable to workplace injuries (IOM, 2000).

As noted in the above definitions, medication errors are unintended events that have the potential to harm patients. In actuality, only some medication errors cause harm to patients (IOM, 2000; Bates, Boyle, Vander Vliet, Schneider, & Leape, 1995). The IOM suggests that medication errors occur to patients in hospitals at an average of one per day, but instances of harm occurring to those patients are only 2 in 100 admissions (2007). Studies classify medication

errors resulting in harm to patients as preventable adverse drug events (IOM, 2007; Gurwitz, et al., 2003; Bates, et al., 1995). It is important to delineate the relationship of medication errors to adverse drug events (ADE). Medication errors are mistakes that occur in the process of treating a patient with drugs. All medication errors are preventable though only some may cause harm. Adverse drug events may be the result of medication errors or may be beyond the knowledge or control of health care providers. For example, a patient with an undiscovered allergy receiving treatment with a drug that triggers the unknown allergy could have an adverse drug event. In this particular case, the ADE is not the result of an error because the allergy was unknown to the patient and provider at the time. In this instance, the adverse event was not preventable. All instances of harm inflicted upon patients resulting from treatment with drugs are ADEs; but not all adverse events occurring during treatment with drugs are medication errors. Only ADEs resulting from medication errors are preventable ADEs. It is not possible to prevent all ADEs, but by reducing or eliminating the number of medication errors, the number of preventable ADEs will also decrease.

Studies of medication errors often classify those errors according to the point in the treatment process at which the error occurs (IOM, 2007; Thomsen & Schroeder 2004; Gurwitz, et al., 2003; Bates, et al., 1995). The chain of events describing the treatment of patients with drugs involves procurement, prescribing, dispensing, administering, and monitoring the patient's reaction. Such classification is problematic. Medication errors may involve more than one event in the process of providing medication to patients or events could overlap. Consider a scenario in which a handwritten prescription indicates a drug with a name similar to a different drug. Any reasonable pharmacist could interpret the prescription to indicate the intended drug or the one with a similar name. The event could constitute a dispensing or prescribing error. Hence, there

are many other examples of errors classifiable under multiple categories and all such errors describe the problematic nature of clearly classifying medication errors.

The problematic nature of medication error classification makes comparison of medication error-rate studies difficult at best. With varying classification criterion, available studies do not have a single, common foundation upon which to define error data. The result may be data that is not generalizable and can include errant conclusions. Therefore, determining one estimate for the rate at which medication errors occur is very difficult, if not impossible. Even determining that an error has occurred is difficult because most errors do not cause harm and can easily go unnoticed. On the other hand, determining that an ADE occurred is relatively easy. In the case of ADEs, harm occurred to a patient. Because harm occurs upon an ADE, healthcare providers must produce documentation of the patients' condition. Most hospitals conduct retrospective studies of patient charts or spontaneous reporting than show what occurred and when it occurred (Jha, et al., 1998). The IOM's *Preventing Medication Errors: Quality Chasm Series* (2007) examined ADE estimates based on three care settings: hospital, long-term, and ambulatory. The IOM examined multiple studies dating from 1995 to 2005, estimating that at least 1.5 million preventable ADEs occur within the United States each year (IOM, 2007). The IOM suggests that the estimate may be an underestimate due to variance in the data capture methods employed by the studies. At any rate, annual preventable ADEs of 1.5 million constitute more than enough reason to pursue methods of medication error reduction.

Just as determining the occurrence rates of ADEs can be problematic, so too can estimating the cost of such events. Determining an accurate cost for all medication errors that occur would be very difficult. As noted , many medication errors can go unnoticed because no harm occurs. The IOM chose the approach of examining studies of ADE costs and formulating

an estimate based on the costs within those studies. Using the same studies for determining preventable ADE occurrence, the IOM examined cost estimates for ADEs occurring in hospital, long-term care, and ambulatory settings. For hospital settings, the IOM cites a study conducted by Bates, et al. (1997) which determined that preventable ADE cost associated with inpatient stays results from additional treatment rendered for injuries resulting from the ADE. The cost estimate determined by Bates, et al. (1997) per inpatient stay is $5,857 per ADE occurrence in 1993 dollars. The IOM estimates, based on a determination of 400,000 preventable ADE occurrences, a cost of $3.5 billion in 2006 dollars for preventable hospital based ADEs (2007).

Estimates of costs for long-term and ambulatory care preventable ADEs are more difficult to obtain. The IOM (2007) cites a study by Gurwitz, et al. (2005) estimating 800,000 preventable ADEs occur annually in long-term care settings. To date, there are no studies available that estimate the cost of preventable ADEs in long-term care settings. A study conducted by Field, et al. (2005) provides the best estimation of preventable ADE costs for ambulatory care, but is limited to elderly patients. Data associated with the study by Field, et al. (2005) allowed the IOM (2007) to estimate preventable ADE cost for Medicare enrollees in an ambulatory setting to be $887 million in 2000 dollars.

Solution

Having established medication errors as a widespread and costly problem, the issue becomes how to address the problem. In a follow up to the 2000 report, *To Err is Human*, the IOM released an additional report entitled *Crossing the Quality Chasm* in 2001. While *To Err is Human* focused primarily on raising awareness of the existence of substantial safety issues, *Crossing the Quality Chasm* proceeded to suggest steps to solve many of those issues. Key among recommendations for improving the healthcare system is the establishment of data

systems that are interoperable and support the flow of information for patient care and scientific research (IOM, 2001). In terms of error reduction, it is nearly impossible to definitively state "what might have been" in current cases had health information systems been in place, but studies predict dramatic error reduction with the use of health information systems (Harrison & Palacio, 2006; Hillestad et al., 2005; Bates & Gawande, 2003). A study conducted by Bates, et al. (1998) shows that automated medication prescribing, specifically, reduces medication errors by more than 50 percent.

Health information systems, as a solution to the ADE problem, is more complicated than it may initially seem. According to a report released by the IOM Committee on Improving the Patient Record in 1997, the IOM and others have advocated the adoption health information systems in the practice of medicine since the early 1990s (Dick, Steen, & Detmer, 1997). Unfortunately, after nearly two decades of trying, the medical industry has not accomplished wide spread adoption of interoperable health information systems. A study by Jha, et al. (2006) estimates that only 9 percent of physicians and 5 percent of hospitals have adopted health information systems capable of interconnection. The primary reason for the failure of the healthcare industry to adopt data automation is the misalignment of economic incentives (Kleinke, 2005). Health information systems are specifically in the interest of patients and health insurers due to their propensity to reduce unnecessary and redundant care, effectively lowering care costs (Kleinke, 2005). Healthcare providers, however, stand to lose vast amounts of revenue because the elimination of unnecessary or redundant care previously rendered or reimbursed on a fee-for-service basis. Hence, the savings realized by the health insurers are tantamount to a reallocation of healthcare provider revenue (Hillestad, et al., 2006). In addition, healthcare

providers have concerns with unresolved issues such as data ownership and interpretation, as well as exposure to litigation (Bates & Gawande, 2003).

Health information systems, as referred to within the studies referenced to this point, have been robust systems that capture all data concerned with a patient's encounter for treatment. Such data pertains to imaging, doctor's notes and orders, laboratory tests and results, medications, and all other aspects of the patient's care. Such systems are comprehensive in nature. While some studies have called for interconnected, comprehensive health information systems, the overarching network necessary to connect all health information systems together does not exist. Proprietary, end-user systems that function within a doctor's office, a multiple physician practice, or a defined set of healthcare facilities do exist, but there is not currently an overarching network to connect all such systems (Kleinke, 2005). Robust systems incorporating all care data, accessible to patients, providers, and payers; create conflicting interests among stakeholders. These conflicting interests have precluded the creation of any overarching network that can connect various points of care to include payers. Thus, even interoperable end-user comprehensive health information systems could not foster comprehensive health information exchange because of the lack of an overarching network to connect them all (Kleinke, 2005).

In large part, conflicting interests have forestalled a broad, drastic shift to information technology in the healthcare industry. The failure of such drastic policy changes should come as not surprise. Longest (2002) suggests that successful policy must be incremental. However, where drastic change has failed, incremental change has and can continue to succeed. The pharmaceutical industry chose to bypass the conflicting issues of one overarching network exchanging all health information by creating a network for the express purpose of exchanging medication data. Two such networks emerged in 2001: the Pharmacy Health Information

Exchange from SureScripts and the National Patient Health Information Network from RxHub. Both provide essentially the same service; a network that electronically connects physicians, pharmacies, and health insurers through interoperable end-user prescribing software (RxHub, 2008; SureScripts, n.d.). These limited networks are the key difference between medication information systems and a comprehensive health information system.

Unfortunately, the systems exclude inpatient medication treatment. Inpatient and outpatient medication treatment differ because of the source and method providing the patients with medication. Inpatients receive their medications via physician or provider orders listed within an inpatient record. Hospitals provide the indicated medication from internal pharmacies based on the documented provider order. Outpatients, on the other hand, receive their medication via a prescription. Though documentation of the medication treatment occurs in the outpatient record, the patient renders the prescription to a pharmacy in order to obtain the medication. The inpatient process is internal to the hospital; as such, an internal system is required. The outpatient process relies on communication between the physician and an external pharmacy. Thus, a medication information system that links physicians, pharmacies, and insurers can support the outpatient process. Only a robust health information system with computerized provider order entry is suitable for use in an inpatient setting. Such systems are subject to the trappings of the patient and payer cost reduction that is, in effect, the reduction of healthcare provider's revenue conflict that has prevented the overall automation of health information.

Though the current healthcare industry landscape is not ready for robust health information systems, the industry may be ready for medication information systems. Three factors have set the stage for medication information systems to become reality. First, as previously mentioned, RxHub and SureScripts have established information networks capable of

connecting physicians, payers, and pharmacies. Second, the laws in all 50 states and the District of Columbia now permit the use of medication information systems (SureScripts, 2007). Third, the Centers for Medicare and Medicaid Services (CMS) published the final rules on adoption of technical standards for medication information systems, termed electronic prescribing (Medicare Program; Standards for E-Prescribing Under Medicare Part E and Identification of Backward Compatible Version of Adopted Standard for E-Prescribing and the Medicare Prescription Drug Program (Version 8.1); Final Rule, 2008). These technical standards provide for integration on several key points. The standard prescribes how data will be structured, stored, and transmitted. This uniformity insures interoperability across systems and stable network performance. In addition, the standard insures that systems adhere to security and privacy requirements established by the Health Insurance Portability and Accountability Act of 1996 (HIPAA). As such, the protected health information contained in medication-related transactions is as safe and private as automated financial system transactions and within legal requirements (Baghdadi, 2008). Finally, the CMS electronic prescribing standard provides criteria with which to certify end-user and network software as standard compliant. Certification is important to end-users because it provides a basis for ensuring the product performs its intended task in the intended way. The Department of Health and Human Services contracted with the Certification Commission for Health Information Technology (CCHIT) to develop and evaluate certification criteria and create as inspection process for health information technology (n.d.).

System Capabilities

With the stage set for medication information systems or electronic prescribing, it is necessary to present a description of what capabilities electronic prescribing systems provide to the healthcare industry. Electronic prescribing systems provide the vehicle for electronic

transmission of prescriptions directly from the prescriber to the pharmacy, automated refill authorization processing, patient medication history, insurance eligibility, and formulary information (RxHub, 2008; SureScripts, n.d.). Still, to understand the systems, one must understand that these services are available on the networks created by RxHub and SureScripts, but the integration of these services in to a usable system is dependent upon the end-user software that interfaces with the overarching network. Determination of system usability is highly subjective as it is often based on user preferences, but multiple options exist that utilize one or both overarching networks with seamless operation for the user. Because of the services offered by the networks, electronic prescribing software can provide additional benefits to physicians such as drug allergy warnings and contraindication warnings based on patient history, common dosing suggestions based on current medical practice and evidence, and formulary information tailored to the patient's insurance provider (RxHub, 2008; SureScripts, n.d.). In addition, the healthcare providers can generate medication information sheets at the point of care in order to facilitate patient/provider communication regarding the treatment plan.

Free System

One of the most interesting developments in electronic prescribing is the offer of a free electronic prescribing system. A coalition of technology companies, health benefit companies, and healthcare providers formed the National ePrescribing Patient Safety Initiative (NEPSI) in order to address the barriers to adoption of electronic prescribing by physicians (NEPSI, n.d.). The software solution offered by NEPSI is a web based electronic prescribing solution and is free to all state-licensed physicians authorized by the U.S. Drug Enforcement Administration to prescribe drugs. The NEPSI solution, eRx NOW, is accessible on any computer or device with access to the internet. The eRx NOW features a complete prescription fill history, real-time

connectivity with 99 percent of the nation's pharmacies, and real-time insurance formulary verification (NEPSI, n.d.). Additionally, eRx NOW contains features to help prevent medication errors such as notification for drug-to-allergy and drug-to-drug errors, as well as automatic verification of minimum and maximum dosages (NEPSI, n.d.). NEPSI deployed the eRx NOW system nationally on January 31, 2007. Allscripts, a NEPSI sponsor and software provider, has a five-year agreement with the consortium to keep eRx NOW available and free until 2012 (B. Musselman, personal communications, April 25, 2008).

Political Circumstances

Federal Legislative Branch

The political interest in medication errors and health information technology must not be overlooked. In the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003, the U.S. Congress placed special emphasis on studying medication errors and development of standards for electronic prescribing. The law instructed the Secretary of the Department of Health and Human Services (HHS) to contract with the Institutes of Medicine of the National Academies of Science to study medication safety and quality issues and to adopt standards for the electronic transmissions of prescriptions (Medicare Prescription Drug, Improvement, and Modernization Act, 2003). As a result, the IOM produced *Preventing Medication Errors: Quality Chasm Series* in 2007. The study demonstrated the widespread danger of medication errors and recommended electronic prescribing and data systems as a way to reduce medication errors (IOM, 2007). In addition to the study, the MMA also required the HHS to develop technical standards to support electronic prescribing. The HHS through the Centers for Medicare and Medicaid Services, published the final rule establishing the technical standards necessary to support electronic prescribing systems on April 7, 2008.

Many members of Congress remain committed to fostering the adoption of electronic prescribing. On December 5, 2007, bipartisan members of the House of Representatives and Senate introduced bills designed to encourage the use of electronic prescribing by physicians. The bills provide for a one-time electronic prescribing adoption bonus and an on-going one percent Medicare reimbursement bonus for physicians treating Medicare patients and using electronic prescribing. Conversely, the bills provide for a 10 percent reduction in Medicare reimbursement for physicians not using electronic prescribing by a deadline to be determined (U.S. House of Representatives Bill 4296, 2007; U.S. Senate Bill 2408, 2007). Much work remains to be done before passage in to law is possible. The Senate proposal is being reviewed in the Senate Finance Committee, while the House bill is under review in the House's Ways and Means Committee. Though it has many proponents, it is too early to know if the bill will succeed.

Federal Executive Branch

While the Legislative Branch has taken a direct leadership role in fostering the adoption of electronic prescribing technology, the Executive Branch has taken a much broader approach. In his 2004 announcement, President George W. Bush decried as a goal that most Americans should have electronic health records within 10 years (Department of Health and Human Services, 2004). In 2005, the HHS established the American Health Information Community (AHIC) as a committee of public and private sector leaders from a broad spectrum of health care sector stakeholders (Department of Health and Human Services, 2006). AHIC is an advisory panel intended to recommend ways to accelerate a market-led introduction of an interoperable health information systems. Executive Branch efforts focus on the development of comprehensive health information systems. However, such a broad approach ignores the

incremental possibilities and falls victim to misaligned incentives that work against comprehensive health information systems (Kleinke, 2005).

State Government

At the state level, Texas created the Texas Health Information Technology Advisory Committee (HITAC) (Texas Senate Bill 45, 2005). The HITAC, in turn, produced the Roadmap for the Mobilization of Electronic Healthcare Information in Texas (HITAC, 2006). In the roadmap report, the HITAC suggested the formation of a quasi-governmental body comprised of individuals from public and private sector stakeholders termed the Texas Health Services Authority (THSA). The HITAC envisioned the THSA as a standards body that would facilitate the creation of a statewide health information network. Texas House Bill 1066 (2007) was signed into law on June 15, 2007, immediately establishing the THSA. The law mandated the THSA to (1) promote, implement, and facilitate the voluntary, secure electronic exchange of health information and (2) create incentives to promote, implement, and facilitate the voluntary and secure electronic exchange of health information (Texas House Bill 1066, 2007). Unfortunately, the legislature did not appropriate funding for the THSA. To date, the THSA is floundering. The State Executive and Legislative positions hold that market forces should dictate industry standards and technology adoption. The State of Texas has not directly addressed electronic prescribing except to approve electronic prescribing as a legal method.

Industry Interest Groups

Beyond the branches of government, industry interest groups significantly contribute to the political landscape surrounding electronic prescribing. The primary industry groups concerned with electronic prescribing are physicians, pharmacies, and health insurers. Within these groups, some have specific concerns and all have specific perspectives but are generally

supportive of electronic prescribing. The Texas Medical Association (TMA) is a state-level trade organization composed of Texas physicians. As such, the TMA is devoted to supporting and furthering the interests of Texas physicians. Though many health professionals such as optometrists, podiatrists, physician assistants, and nurse practitioners may legally prescribe mediations within their respective scopes of practice, physicians are the primary originators of prescriptions. Because of their primacy, physicians are, perhaps, the most pivotal determinant of the success or failure of the adoption of electronic prescribing. Mr. Darren Whitehurst, Vice President for TMA's Division of Advocacy, states that TMA is broadly in favor of health information technology adoption and specifically in favor of electronic prescribing adoption (personal communications, June 3, 2008). Mr. Whitehurst stressed that physicians have a number of concerns with regard to electronic prescribing including cost, technology standardization, and security (personal communication, June 3, 2008). These concerns often create formidable barriers to adoption.

The Texas Pharmacy Association and the Texas Association of Health Plans mirror each other's stance regarding electronic prescribing. Both trade associations are strongly in favor of electronic prescribing. The automation of the process presents a drastic increase in efficiency of pharmacy operations and insurance billing data. The increase in efficiency is still secondary to the savings obtained through the prevention of medication errors. The benefit to Texas pharmacies is apparent in the form of the negation of illegible physician handwriting, provider alerts for similar drug names, and automatic dosage, drug-to-drug, and drug-to-allergy checks. Industry testimony to the National Committee on Vital and Health Statistics reported that such common incidents caused almost 30 percent of prescriptions to require pharmacy callbacks, resulting in 900 million prescription-related telephone calls annually (Leavitt, 2007). Fewer

errors and increased administrative efficiency in pharmacies promises substantial savings to health insurance providers. As previously noted, the IOM estimates that preventable ADEs in outpatient settings cost in excess of $877 million annually (IOM, 2007). A system that can prevent even half of the preventable outpatient ADEs from occurring can potentially save over $400 million in wasted healthcare dollars on an annual basis. Such savings constitutes millions of dollars in prevented expenditures by health insurers. Electronic prescribing is beyond a doubt a goal of the pharmacies and insurers.

Policy Options

Given that medication errors are a major problem, electronic prescribing is a viable solution for reducing such errors, and that the political environment is ripe to tackle this issue; at least three options available to policy makers. First, policy makers can leave the medical industry to status quo with no steps taken to foster electronic prescribing adoption. Second, a consortium of industry groups can lead adoption of electronic prescribing. Or, third, policy makers can institute a mandate for the adoption of electronic prescribing.

Option 1: Status Quo

The status quo option requires no intervention. The status quo option assumes that medication errors do not warrant intervention; do not garner enough attention to earn a spot on policymaker's agenda; or that the problem is self-correcting. Supporters of the status quo believe that adoption will occur naturally within the industry; however, the timetable for adoption is uncertain. Though capabilities exist today and adoption could occur markedly faster, status quo allows a very slow adoption rate with little or no information distribution regarding capabilities. In this instance, the consumer endures a marked disadvantage because the consumer is subject to

an error prone system for longer than would otherwise be necessary. The status quo option represents a policy direction that would not serve the best interests of the patient.

In this particular instance, Texans need do nothing. The Federal efforts and efforts mounted in other states may sufficiently change the market dynamics such that Texas becomes a late adopter of technology that is available today. The status quo option is easiest in that no efforts are required.

Option 2: Industry-Led Adoption

The industry-led option does not rely soley on market forces to create incentives to encourage electronic prescribing adoption. Rather, industry groups work through points of mutual interest to develop conditions that make adoption more favorable. The development of a cost-free electronic prescribing solution is an example of a condition favorable to the adoption of electronic prescribing. Industry groups created the cost-free solution based on addressing interests of pharmacies, insurers, physicians, and patients. The key to industry-led adoption rests with demonstrating how the option fits all parties' interests and solves the issue. Clearly, the potential of electronic prescribing to reduce errors and costs is in the primary interests of patients and insurers. Pharmacies and physicians benefit from increased efficiencies and reduced exposure to costs associated with preventable ADEs. The vast majority of pharmacies already possess and operate the data systems necessary to support electronic prescribing (RxHub, 2008; SureScripts, n.d.). As stated by Mr. Darren Whitehurst of the Texas Medical Association (personal communications, June 3, 2008), physicians require a system that does not involve high-cost software and hardware solutions and that meets HIPAA security and privacy standards. The cost-free electronic prescribing option addresses all of the concerns posed by the Texas Medical Association. Such a solution allows each industry group to support the adoption of electronic

prescribing without creating conflict with stated interests of other industry segments involved. Demonstration of the viability of industry-led adoption of electronic prescribing represents a chance for a significant win for pharmacies, insurers, physicians, and patients.

Industry-led electronic prescribing adoption for Texas would require the support of Texas based interest groups, such as the Texas Medical Association, the Texas Association of Health Plans, and the Texas Pharmacy Association. Endorsement from such interest groups serves a two-fold purpose. First, interest groups provide a central point for delineating the policy positions of specific industry segments with regard to electronic prescribing adoption. These groups serve as policy advocates to lawmakers and policy advisors to the industry segments they support. Support needed from interest groups does not end with statements favoring adoption of electronic prescribing. For industry-led electronic prescribing adoption to be viable, interest groups must educate group members on why adoption is in their interests and why it does not conflict with their other interests. With such cooperation, the industry can present a united front on an important issue. Second, interests groups have the capability of aligning the political power of elected officials with their proposed plans. By demonstrating the industry's internal commitment to solve the problem of medication errors, interest groups create a valid argument that lawmaking intervention is not necessary. With an industry-sponsored solution to medication errors, a legislated solution becomes a moot point.

An industry-led initiative could accomplish significant adoption in a short amount of time. As pointed out, electronic prescribing supports the interests of the industry players required to institute it. With availability of a cost-free solution, prescribers can apply immediately and begin using the available system within days. This option can be in place as quickly as Texas

industry interest groups decide to support an industry-led initiative to adopt electronic prescribing.

Option 3: Government Mandated Adoption

The passage of legislation could mandate adoption of electronic prescribing. The specific features of such legislation would be dependent upon the political maneuvering of interest groups jockeying to protect their member's interests. It is not possible to predict with certainty the specifics of such legislation. The outcome of mandated action lends itself to the creation of winners and losers due to variations in political power among interest groups. Additionally, the fight to insure protection of interests creates defensive postures among the various interest groups, rather than cooperative environments. Legislation mandating the adoption of electronic prescribing could benefit consumers in terms of a reduction of medication errors, but may hurt the industry segments that do not "win" in the political process. An example of legislated efforts to mandate adoption of electronic prescribing is the Medicare Electronic Medication and Safety Protection (E-MEDS) Act of 2007 (U.S. House of Representatives Bill 4296, 2007; U.S. Senate Bill 2408, 2007). As referenced previously, the federal government is considering legislation to encourage electronic prescribing by paying incentives to physicians for adoption and usage of electronic prescribing for Medicare patients. In turn, those not adopting electronic prescribing for Medicare patients by a deadline (yet to be determined), would incur payment penalties. To date, this effort has not succeeded. Efforts by lawmakers to subdue an industry sector with diverse segments each having their own specific interests is very problematic. As lawmaking efforts fragment the industry interest groups; so, too, lawmakers become fragmented. As a result, key points in the lawmaking process can stall, yielding no results. Ironically, as difficult as the process may be to complete, if it were successful the needed change would be imminent. Texas

lawmakers have not embarked upon such efforts yet. Though the federal bill does not apply to private insurers, federal healthcare funding and initiatives send strong signals to, and often set trends for, the private sector. Such legislation may persuade private insurers to follow a similar path toward encouraging electronic prescribing adoption.

Evaluative Criteria

According to Longest (2002), incentive to enact policy is highest when salience is high and conflict is low. Further, Longest's research established publicly salient problems as ones that elicit high actual or potential public interest (2002). To evaluate policy options, the salience of the problem and the potential solutions along with each solutions' level of conflict must be determined. The problem, medication errors, has captured national attention as evidenced by sentinel studies such as *To Err is Human* (1999), *Crossing the Quality Chasm* (2001), and *Preventing Medication Errors* (2007). In addition, policymakers have taken steps to work to establish electronic prescribing standards addressing medication errors and have introduced bills designed to encourage adoption of electronic prescribing through Medicare incentives (Medicare Program, 2008; U.S. House of Representatives Bill 4296, 2007; U.S. Senate Bill 2408, 2007). There can be no doubt that salience of the medication error problem is high.

A solution to the medication error problem with a high enough level of salience and low enough level of conflict may provide a window of opportunity to successfully address the problem of medication errors. The complexity and timeframe of a policy option will affect its ability to generate interest. A simple solution with a short timetable will generate more interest than a drawn-out, complex proposal. Of course, the higher the interest generated, the higher the level of salience. Group conflict regarding electronic prescribing policy depends greatly upon how each group perceives that the policy affects their specific interests. In order to evaluate

possible conflict levels, examination of the primary industry segments and their interests are necessary. Any loss or perceived loss regarding a position of interest by any particular industry segment would increase conflict levels. Electronic prescribing involves three healthcare industry segments: physicians, insurers, and pharmacies. Three common expectations shared by industry segments from any solution presented are increased safety/error reduction, cost savings, and privacy/system security. Studies agree that reducing medication errors is vitally important and that electronic prescribing is a major step toward medication error reduction (IOM, 2000, 2001, 2007; Harrison & Palacio, 2006; Hillestad, et al., 2005). Therefore, electronic prescribing will meet industry segment expectations by creating a safer healthcare delivery environment. In terms of cost savings, a reduction in medication errors will save insurers the costs of unnecessary treatment. Physicians and pharmacies stand to gain from increased efficiency. In a report to Congress, Department of Health and Human Services Secretary Leavitt (2007) cites industry testimony that estimates 30 percent of paper prescriptions require pharmacy call backs resulting in 900 million prescription-related telephone calls annually at a cost of $2.7 billion in clinician's time. With regard to data security, as previously noted, the final rules adopted by the CMS for electronic prescribing systems adhere to HIPAA standards for security of protected health information. Meeting industry group expectations will keep conflict low.

The costs of electronic prescribing systems present an additional point of concern for physicians. Studies cite system costs as being a primary barrier to physician adoption of health information systems (Jha, et al., 2006; Harrison & Palacio, 2006; Hillestad, et al., 2005). Mr. Darren Whitehurst of the Texas Medical Association, also affirmed system costs as a potential point of conflict for physicians regarding electronic prescribing (personal communication, June 3, 2008).

Projected Outcomes

Option 1: Status Quo

Currently, industry surveys estimate only 5 to 18 percent of physicians use electronic prescribing (Leavitt, 2007). SureScripts (2007) estimates 6 percent of physicians used electronic prescribing in 2007 and predict that number to grow to 15 percent in 2008. In Texas, SureScripts (2008) reports that 2 percent of physicians used electronic prescribing in 2006 and 4 percent of physicians used electronic prescribing in 2007. Available data suggests electronic prescribing is increasing. However, with no intervention to foster electronic prescribing adoption, industry groups cannot assure continued adoption. Additionally, the rate of adoption will be uncertain at best, and likely much slower than would be optimal for the safe delivery of care. The status quo course of action, or inaction, would have a low salience due to uncertainty of adoption and likely long timeframe. Conflict would be minimal due to the lack of action taken on the matter. Figure 1 demonstrates the low salience and conflict values associated with the status quo.

Option 2: Industry-Led Adoption

A coalition of the Texas Medical Association, the Texas Pharmacy Association, and the Texas Association of Health Plans could have substantial impact in encouraging growth in electronic prescribing in Texas. The industry-led adoption becomes more viable if physicians embrace the cost-free electronic prescribing solution made available through the National ePrescribing Patient Safety Initiative (NEPSI). The stated goal of NEPSI is the acceleration of the adoption of electronic prescribing (n.d.). The cost-free solution uses the standards for interoperability and security adopted by the CMS. Therefore, physicians are not bound to a proprietary system and always have the option to purchase a different service. Cost-free electronic prescribing effectively removes the primary barrier to adoption of electronic

prescribing by physicians. Sponsors have currently pledged to support the project until January of 2012 (B. Musselman, personal communications, April 25, 2008). After such time, NEPSI has announced no plans regarding the service. Widespread adoption of the electronic prescribing through this free service would, over time, create a large, mature market of electronic prescribers for software designers. If, at a future date, the service is no longer free, the large market should provide competition and economies of scale that effectively keep costs lower than they otherwise might have been. Industry-led electronic prescribing adoption could substantially affect electronic prescribing adoption rates in a matter of weeks. Industry-led policy has high salience because, if adopted, it is likely to succeed and can occur quickly. Given availability of the cost-free electronic prescribing service, industry-led adoption meets the expectation of physicians, pharmacies, and insurers; thus establishing a low level of conflict. The salience-conflict chart shown in figure 1 shows the high salience and low conflict potential of industry-led electronic prescribing adoption.

Option 3: Mandated Adoption

A mandated adoption option would accelerate adoption if lawmaking efforts succeed. Legislation may require a substantial amount of time and additional risk of stalling. Backlash from physicians and physician interest groups may effectively slow or stifle such legislation. Additionally, mandated adoption of electronic prescribing negates the purpose of NEPSI. There is no need for a private consortium to support the adoption of electronic prescribing if law exists to mandate its adoption. As a result, the period available for the market to use a free electronic prescribing product and to develop to maturity would not be available. Higher costs are likely due to market immaturity, fewer competing software firms serving the new market, and a mandate for prescribers to use electronic systems.

Mandated adoption policy will garner attention, hence salience, because a successful mandate assures adoption. The timeframe for such an approach detracts from potential salience because even if lawmaking efforts succeed, they take more time than other potential solutions. To illustrate the point, consider a driver having a flat tire. The problem is the flat tire. By way of potential solutions, there is a tire repair shop 2 miles away or a can of fix-a-flat in the trunk. Either solution would repair the flat tire. However, to use the tire repair shop, the driver must remove the flat, make their way to and from the repair shop, and reinstall the tire. The driver could use the can of fix-a-flat to repair the tire in less than five minutes. In much the same way, mandating electronic does not maintain salience if a faster, easier solution is available. The Texas Legislature holds session every other year; 2008 is a session year. Planning for legislative sessions takes place in the off years. Under normal circumstances, a legislator would need to circulate a bill in the off year (2009) for introduction in the 2010 session. Though expedited procedures exist, mandated adoption policy implementation would likely occur in years rather than weeks or months. Mandated adoption of electronic prescribing is salient, but because of a relatively long timetable, salience is not as high as it would otherwise be, particularly in the state of Texas. Mandated electronic prescribing serves the interests of insurers and pharmacies, but saddles physicians with the cost burden of systems required to support electronic prescribing. Legislation forcing such action would generate controversy and high levels of conflict. Figure 1 shows the salience-conflict relationship of a mandated adoption policy.

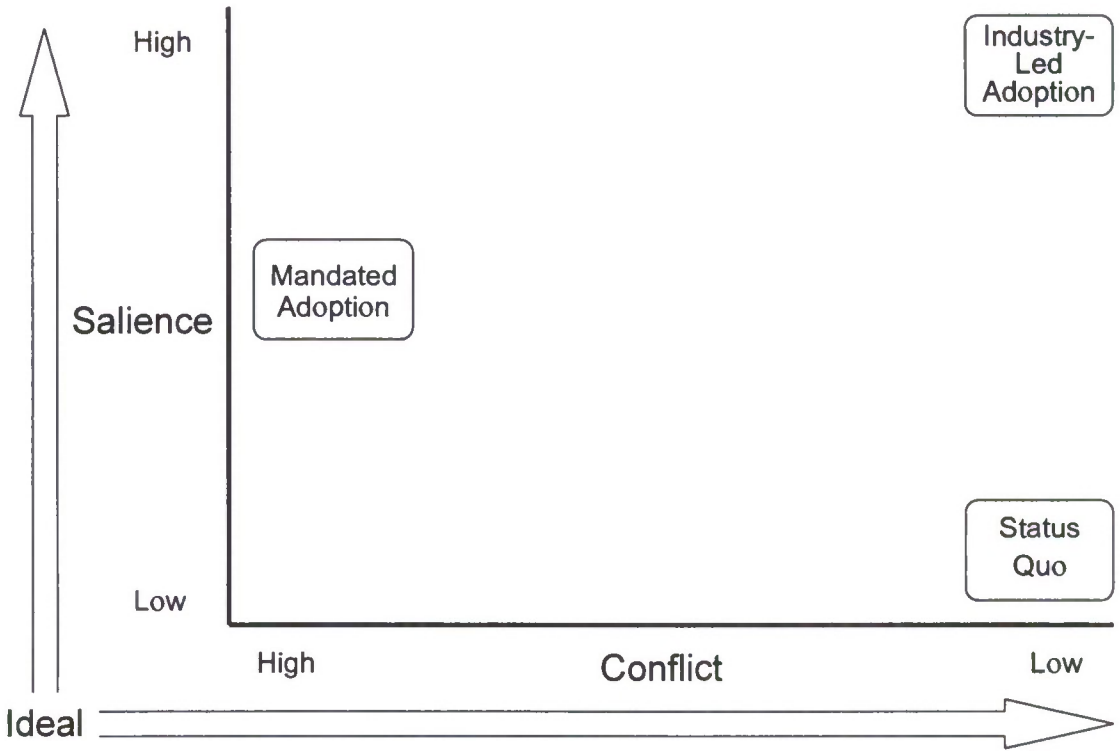

Figure 1. Electronic Prescribing Policy Option Salience-Conflict Chart

Analysis of Trade-Offs

The primary trade-offs between policy options are speed, flexibility, and viability. Each potential policy decision trades some aspect of speed, flexibility, and viability in terms of how electronic prescribing adoption occurs. A status quo policy remains the slowest due to lack of any organized effort to make electronic prescribing a priority. The speed factor of the status quo is evident in Texas' single digit adoption rates for 2006 and 2007 (SureScripts, 2008). An industry-led adoption policy is, by far, the fastest potential policy to enact. The components that make electronic prescribing are already in place and functioning. An industry-led initiative could begin as soon as Texas' industry interest groups can meet, decide on an implementation plan, and disseminate that plan to members. Use of the cost-free solution could literally have thousands of Texas physicians who were not previously electronically prescribing sending

prescriptions electronically within a month. A mandated adoption policy is faster than the status quo, but not nearly as fast as industry-led adoption. The normal timetable for legislation introduction in Texas follows a two-year cycle. Assuming a smooth process through the normal legislative session, mandated electronic prescribing's two-year timeframe is faster than the status quo's indefinite timetable, but slower than industry-led electronic prescribing. Table 1 lists suggested policy and possible timetables for implementation.

Table 1

Evaluation of Policy Speed

Policy Option	Timetable for Implementation
Status Quo	Indefinite
Industry-Led Electronic Prescribing	Months
Mandated Electronic Prescribing	Two Years

In terms of flexibility, policy options differ. Each option places various requirements on those whom the policy affects. The status quo policy is the most flexible. Because the status quo places no pressure or impetus for the adoption of electronic prescribing, any decision to adopt or not adopt is completely acceptable. Industry-led adoption establishes drive from within the industry and sets direction for specific policy goals. An industry-led initiative in not as flexible as the no-direction-at-all approach of the status quo, but has more industry flexibility in self-governance. The industry has the option to set and change guidelines to correspond with industry segment interests. A mandated policy is rigid. Laws are difficult to make, change, or repeal. As a

result, any mandated adoption of electronic prescribing would be the least flexible option. The flexibility trade-offs between policy options are listed in table 2.

Table 2

Evaluation of Policy Flexibility

Policy Option	Flexibility of Options
Status Quo	Highly Flexible
Industry-Led Electronic Prescribing	Somewhat Flexible
Mandated Electronic Prescribing	Rigid

The final trade off to consider regarding electronic prescribing policy is viability, which has two primary dimensions. Policy must be viable or it cannot be implemented or achieve the goals its designers intended. First, the dimension of implementability concerns the likelihood of successfully adopting a proposed policy. Many policy designers conceive policy designed to achieve worthwhile goals, but enacting such policy entails convincing other parties with potentially conflicting interests that a particular course of action is the best one. Conflict among parties holding interests regarding the policy under evaluation can lead to failure to adopt a proposed policy. Second, the dimension of adequacy concerns whether the proposed policy achieves the policy goal. Policy proposed in this study must achieve the goal of electronic prescribing adoption. Texas is in the throws of the status quo option; therefore, it is possible to continue to fail to address electronic prescribing under the "wait-and-see" approach. However, there is no assurance that such an approach will accomplish the goal of electronic prescribing

adoption. An industry-led initiative to adopt electronic prescribing would likely succeed in implementation because the segments involved have no apparent conflicting interests with such policy. Such policy is in each segment's interest. Additionally, an industry-led initiative almost assures adoption because it involves self-governing action on the part of the healthcare organizations. Mandated adoption policy faces significant resistance to implementation. Because the conflict level associated with a mandated solution is high, opposing interest groups fragment political will to enact such a measure. Mandated adoption will likely fail during the lawmaking process. Despite its likely implementation failure, if mandated adoption could succeed, it would be the policy option most likely to achieve the goal of electronic prescribing adoption. Table 3 provides a visual demonstration of the viability dimensions associated with listed policy options.

Table 3

Evaluation of Policy Viability

Policy Option	Implementable	Achieves Goal
Status Quo	Yes	No
Industry-Led Electronic Prescribing	Yes	Yes
Mandated Electronic Prescribing	No	No

Recommendation and Conclusion

Research supports the selection of an industry-led electronic prescribing policy for Texas. As demonstrated, industry-led policy has high salience and low conflict, making it an ideal choice according to Longest (2002). In addition, the industry-led adoption policy supports the

fastest adoption of electronic prescribing while remaining flexible and viable. Further, provision of this report to the Texas Medical Association, the Texas Pharmacy Association, and the Texas Association of Health Plans should accompany a request for an initial meeting to discuss support and implementation of such an initiative.

Medication errors blight our healthcare system. Preventable adverse drug events cost billions of dollars each year in terms of corrective care and lost productivity, not to mention their cost in lives. With Institute of Medicine (2007) estimating over 500,000 adverse drug events occur in outpatient settings annually, there has never been a better time to address the issue. The U.S. Census Bureau (2007) estimates that Texans comprise 12.6 percent of the U.S. population, and thus, are subject to over 63,000 preventable ADEs according to the IOM's estimates. At an estimated cost of $1,983 per ADE (cost in year 2000 dollars, IOM, 2007), preventable adverse drug events cost Texans over $124.9 million annually. Studies agree that the best way to address medication errors is through the implementation of electronic prescribing systems (Harrison & Palacio, 2006; Hillestad et al., 2005; Bates & Gawande, 2003). The introduction of two overarching pharmacy data networks in 2001 and the adoption of electronic prescribing technical standards by the Centers for Medicare & Medicaid Services in 2008 have created the foundation for electronic prescribing to be technically viable. Further, with the development of a cost-free electronic prescribing solution, electronic prescribing policy has become politically viable. Analysis of current political circumstances and likely political options suggests that the best way to implement adoption of electronic prescribing is through an industry-led coalition of groups with aligned interests.

The solution of electronic prescribing can address the problem of medication errors. An industry-led electronic prescribing adoption policy provides an elegant policy solution that is

highly salient and free from major conflict. In other words, industry-led electronic prescribing adoption is the ideal policy choice. The emergence of a cost-free electronic prescribing system has effectively eliminated any remaining barriers to adoption and opened a window of opportunity for the successful implementation of adoption policy. Now is the time for Texas physicians, pharmacies, and insurers to stand together on an important issue for the quality and safety of the care they provide to Texans.

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